CHAPTER 5

WATER QUALITY PARTNERSHIPS IN THE STONES RIVER WATERSHED

5.1 BACKGROUND. The Watershed Approach relies on participation at the federal, state, local and nongovernmental levels to be successful. Two types of partnerships are critical to ensure success:

- Partnerships between agencies
- Partnerships between agencies and landowners

This chapter describes both types of partnerships in the Stones River Watershed. The information presented is provided by the agencies and organizations described.

5.2 FEDERAL PARTNERSHIPS.

5.2.A. Natural Resources Conservation Service. The Natural Resources Conservation Service (NRCS), an agency of the U.S. Department of Agriculture, provides technical assistance, information, and advice to citizens in their efforts to conserve soil, water, plant, animal, and air resources on private lands.

Performance & Results Measurement System (PRMS) is a Web-based database application providing USDA Natural Resources Conservation Service, conservation partners, and the public fast and easy access to accomplishments and progress toward strategies and performance. The PRMS may be viewed at http://sugarberry.itc.nrcs.usda.gov/netdynamics/deeds/index.html. From the PRMS Products Menu, select "Products," then select "Conservation Treatments." Select the desired program and parameters and choose "Generate Report."

The data can be used to determine broad distribution trends in service provided to customers by NRCS conservation partnerships. These data do not show sufficient detail to enable evaluation of site-specific conditions (e.g., privately-owned farms and ranches) and are intended to reflect general trends.

CONSERVATION PRACTICE	ACRES
Conservation Buffer	98
Erosion Control	1,489
Irrigation Management	0
Nutrient Management Applied	664
Pest Management	1,447
Prescribed Grazing	1,497
Salinity and Alkalinity Control	0
Tree and Shrub Practices	0
Tillage and Residue Management	991
Wildlife Habitat Management	791
Wetlands Created, Restored, and Enhanced	0
Total	**6,976**

Table 5-1. Conservation Practices in Parnership with NRCS in Stones River Watershed. *Data are from PRMS for October 1, 1999 through September 30, 2000 reporting period. More information is provided in Stones-Appendix V.*

5.2.B. United States Geological Survey Water Resource Programs—Tennessee District. The U.S. Geological Survey (USGS) provides relevant, objective scientific studies and information to evaluate the quantity, quality, and use of the Nation's natural resources. In addition to national assessments, the USGS also conducts hydrologic investigations in cooperation with numerous federal, state, and local agencies to address issues of local, regional, and national concern.

The USGS collects hydrologic data to document current conditions and provide a basis for understanding hydrologic systems and solving hydrologic problems. In Tennessee, the USGS records streamflow continuously at more than 60 gaging stations equipped with recorders and makes instantaneous measurements of streamflow at many other

stations. Groundwater levels are monitored statewide, and the physical, chemical and biological characteristics of surface and ground waters are analyzed. USGS activities also include the annual compilation of water-use records and collection of data for national baseline and water-quality networks. National programs conducted by the USGS include the National Atmospheric Deposition Program, National Stream Quality Accounting Network, and the National Water-Quality Assessment Program.

Current Water-Resource Investigations in the Stones River Basin:

> Spatial distribution and flow response characteristics of sinkholes near Mrfreesboro, TN (Cooperative study with City of Murfreesboro Engineering and Planning Department)

Continuous Streamflow Information—Stones River Basin:

> 03428200 West Fork Stones River at Murfreesboro, TN

For streamflow data, contact Donna Flohr at (615) 837-4730.

More information on the activities of the USGS can be obtained by accessing the Tennessee District home page on the World Wide Web at http://tenn.er.usgs.gov/

5.2.C. United States Army Corps of Engineers-Nashville District. The geographic boundaries of the Nashville District Corps of Engineers consist of the entire Cumberland and Tennessee river basins, a combined area of approximately 59,000 square miles. This includes portions of seven states: Tennessee, Kentucky, Alabama, Virginia, Mississippi, Georgia, and North Carolina.

Overall responsibilities for the Nashville District include operation and maintenance of 10 reservoirs within the 18,000 square mile Cumberland River Basin. These operate for some or all of the following purposes: hydropower, flood control, navigation, water supply, water quality, fish and wildlife, and recreation.

Within the 41,000 square mile Tennessee River Basin the Nashville District operates a series of navigation locks and has regulatory permit authority over dredge and fill activities under the Clean Water Act.

WATER QUALITY ACTIONS IN THE STONES RIVER WATERSHED

J. Percy Priest Reservoir and Tailwater Water Quality Restoration Iniative

J. Percy Priest Dam is located at Stones River Mile 6.8 and impounds J. Percy Priest Reservoir. At summer pool J. Percy Priest Reservoir covers an area of 14,200 acres, however the reservoir is relatively shallow with an average depth of just 33 feet. Various factors including the relative shallowness of the reservoir combined with the large human population in the upstream watershed and the naturally, nutrient rich, local geology contribute to the occurrence of seasonally stressful water quality conditions in J. Percy Priest Reservoir. J. Percy Priest Dam impacts the Stones River downstream from the dam because there is no provision for a continuous minimum flow. Consequently during long periods when there are no power releases, portions of the tailwater can develop poor water quality conditions.

A water quality restoration initiative is underway to address problems related to seasonal stratification and the lack of a minimum release at the dam. Turbine venting, a well proven technology to improve dissolved oxygen of dam releases, is not feasible at J. Percy Priest Dam. Instead, the installation of an oxygen injection system in the dam's forebay is being evaluated. Initial studies indicate such a system would greatly improve water quality near the dam and thus in the turbine releases. Costs for an oxygen injection system are high and would recur annually. However, there is high level management awareness within the Nashville District Corps of Engineers concerning the severe, recurring water quality problems at J. Percy Priest Reservoir. With this awareness has come a new resolve to implement a solution. At this same time the Nashville District COE is seeking a partner or partners to help defray some of the high costs for this improvement.

This year the Nashville District Corps of Engineers will also evaluate options for providing a minimum continuous release from J. Percy Priest Dam. A promising option that will be evaluated is modification of one of the spillway gates. However, it must be cautioned, that the provision of a minimum continuous flow could impact the stability of the summer recreation pool and would negatively impact hydropower production at this multipurpose dam. These considerations will be carefully weighed during the evaluation process.

Cooperation with the Tennessee Department of Environment and Conservation, Division of Water Pollution Control

The Nashville District Corps of Engineers collects a significant volume of physical, chemical, and biological water quality data every year. These data are collected at representative points both within the reservoir, on various major inflow streams, and in the tailwater. The data are used to help determine watershed water quality trends and to provide for better management of the reservoir. These data are also provided to the TDEC, Division of Water Pollution Control. The water quality data provided by the Corps helps fill in gaps in the water quality record for area streams and rivers which enter J. Percy Priest Reservoir and provides the major source of information for water quality conditions in the reservoir body itself.

Environmental Education

Environmental education opportunities are provided to area school age children by the Nashville District Corps of Engineers. Water Quality Control personnel participate in environmental awareness programs conducted at J. Percy Priest by providing information about various aspects of water quality. These presentations include "hands on" demonstrations of sophisticated water quality monitoring instruments and displays of biological specimens that demonstrate responses of biological systems to water quality conditions. The value of such environmental education is enormous because it touches young people early in their lives. It hopefully contributes to a greater lifelong awareness of the importance of conserving and improving water quality and water resources on an individual basis.

The address of the Nashville District home page is http://www.orn.usace.army.mil/

5.2.D. U.S. Environmental Protection Agency (EPA). AS part of TMDL development being supported by EPA Region 4's Water Management Division, the Science and Ecosystem Support Division will conduct water quality studies of the West Fork Stones River.

The primary objective of this study is to collect a representative set of water quality and hydraulic data for the West Fork Stones River in order to develop a calibrated model of the system during low flow conditions. This calibrated model will be used as one of the TMDL development tools for the West Fork Stones River, and it is anticipated that it will provide a better understanding of the impact of nutrient enrichment and depressed dissolved oxygen concentrations during a time frame when nonpoint sources dominate the system. Ultimately, the model should be able to account for the difference between base flow point source dominated and high flow point and nonpoint source dominated conditions.

For more information, contact:

Tom McGill, PE
U.S. Environmental Protection Agency-Region 4
61 Forsyth Street, SW
Atlanta, GA 30303-8960
mcgill.thomas@epa.gov

5.3 STATE PARTNERSHIPS.

5.3.A. TDEC Division of Water Supply. Congress, the Environmental Protection Agency, and the states are increasing their emphasis on the prevention of pollution, particularly in the protection of the raw water sources for public water systems. The initial step toward prevention of contamination of public water supplies came with the Federal Safe Drinking Water Act Amendments of 1986. At that time, each state was required to develop a wellhead protection program to protect the water source of public water systems relying on groundwater (wells or springs). The new Source Water Assessment provisions of the Federal Safe Drinking Water Act of 1996 Amendments expanded the scope of protection beyond groundwater systems to include protection of the waters supplying surface water systems.

More information may be found at: http://www.state.tn.us/environment/dws.

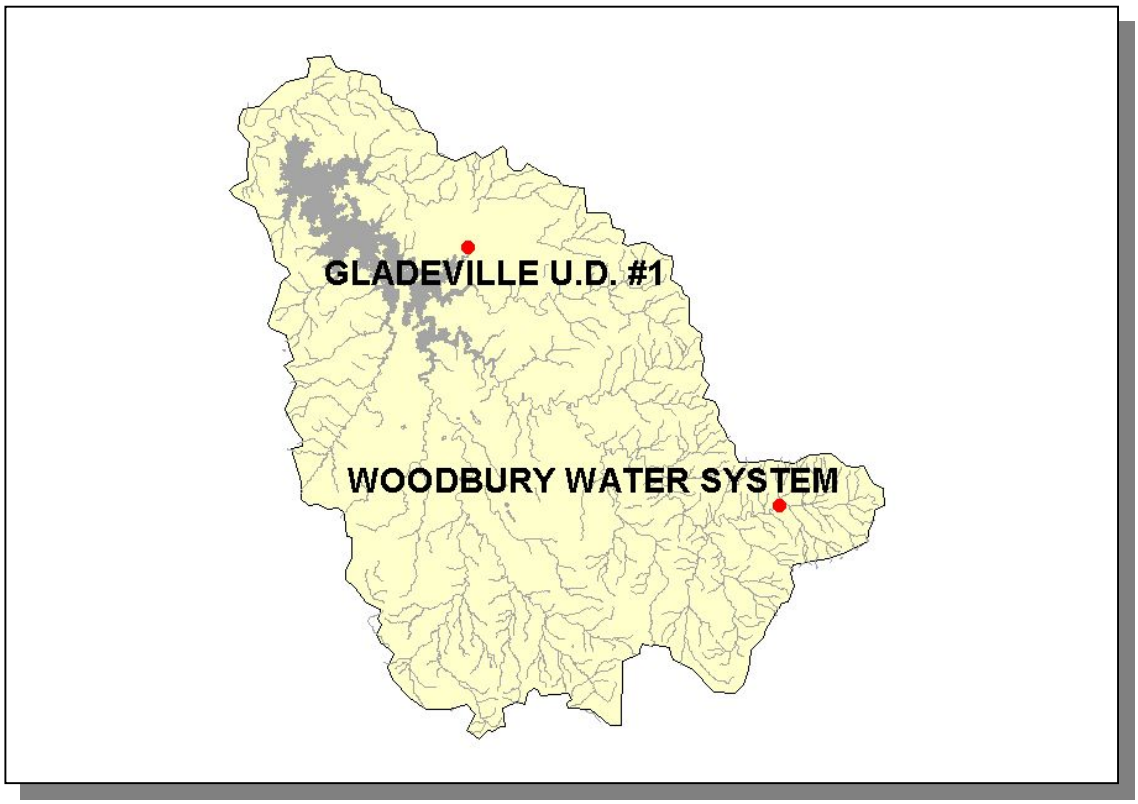

Figure 5-1. Location of Communities Using Groundwater for Water Supply in the Stones River Watershed.

A "wellhead" is the source area for the water, which is withdrawn through a well or spring, similar to the concept of the head of a river. To protect the water supply, it is important to know from where the water flowing to that well or spring is coming. Source water/wellhead protection areas for public water systems using groundwater are generally based on hydrologic considerations and/or modeling. Source water protection

areas for public water systems using surface water are based on the portion of the watershed area upstream of the water intake.

There are three basic steps involved in a wellhead protection program: 1) defining the wellhead protection area, 2) inventorying the potential contaminant sources within that area, and 3) developing a wellhead protection plan. The official designation of wellhead protection areas provides valuable input and emphasis to government agencies in the siting of facilities and the prioritization and cleanup of contaminated sites.

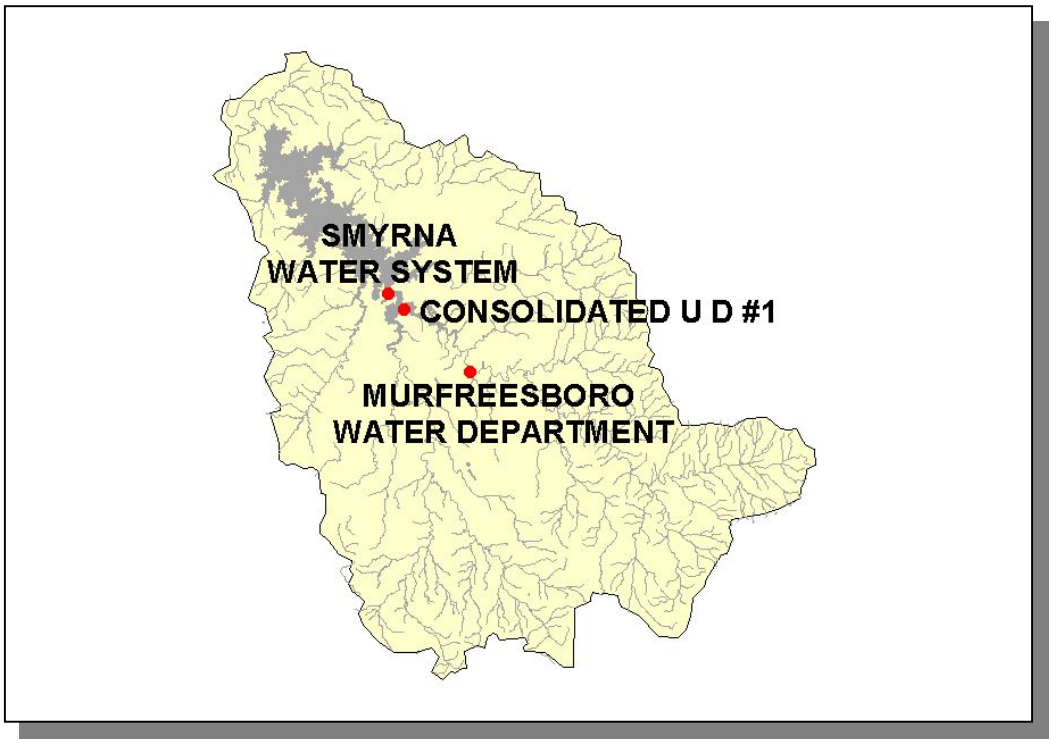

Figure 5-2. Location of Communities in the Wellhead Protection Program in Stones River Watershed.

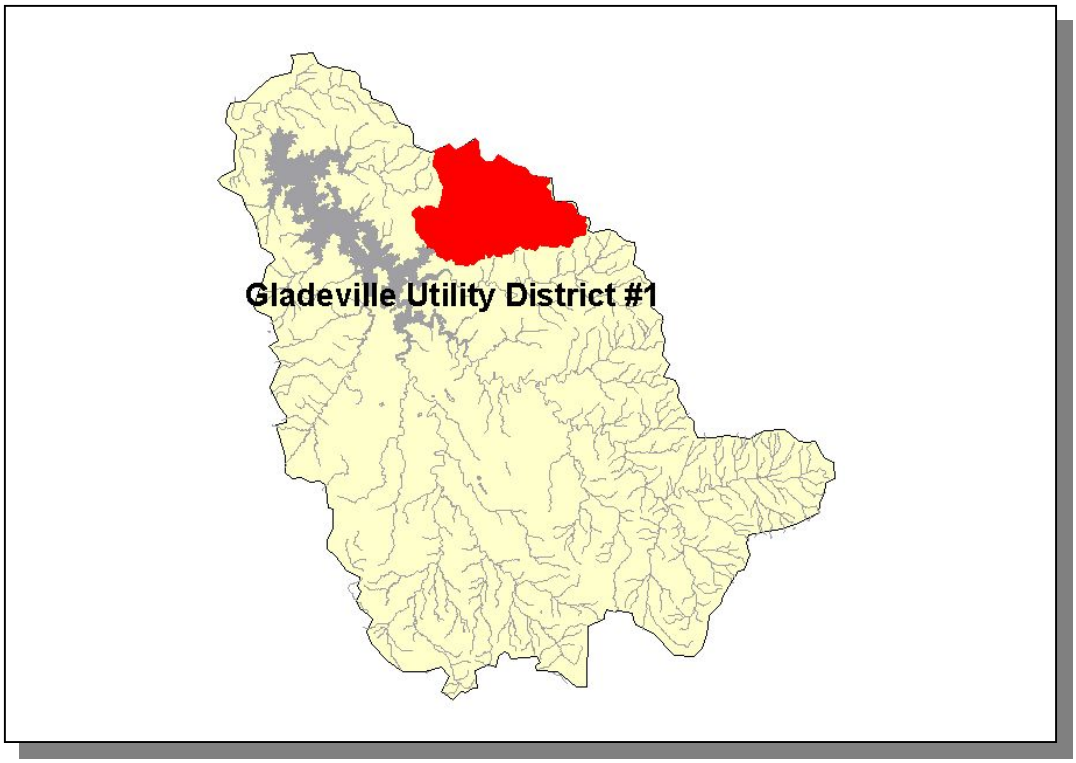

Figure 5-3. Location of Communities with Surface Water Intakes for Water Supply in Stones River Watershed.

As a part of the Source Water Assessment Program, public water systems are evaluated for their susceptibility to contamination. These individual source water assessments with susceptibility analyses are available to the public at http://www.state.tn.us/environment/dws as well as other information regarding the Source Water Assessment Program and public water systems.

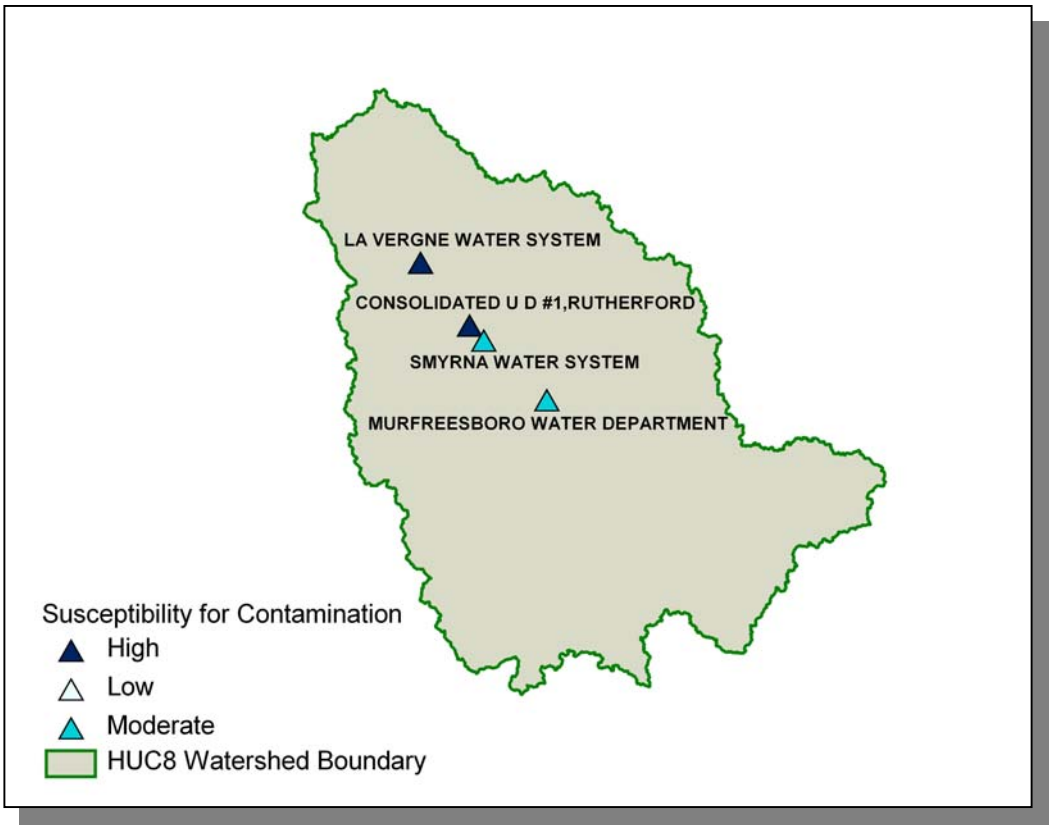

Figure 5-4. Susceptibility for Contamination in the Stones River Watershed.

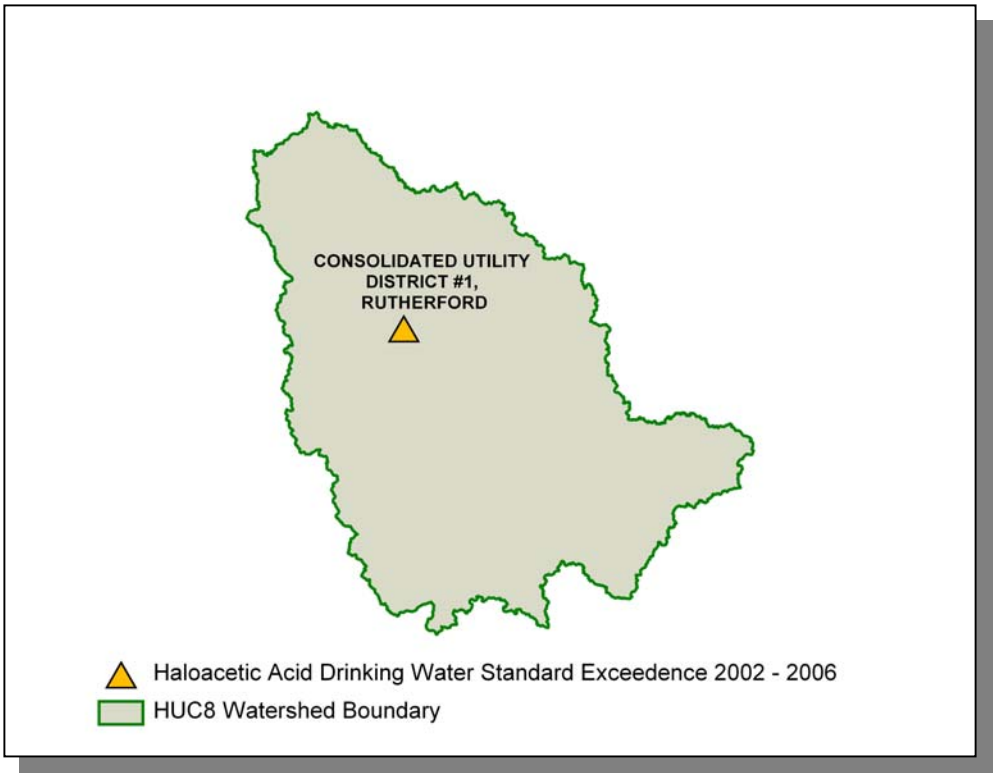

Figure 5-5. Exceedences of the Haloacetic Acid Drinking Water Standard in the Stones River Watershed.

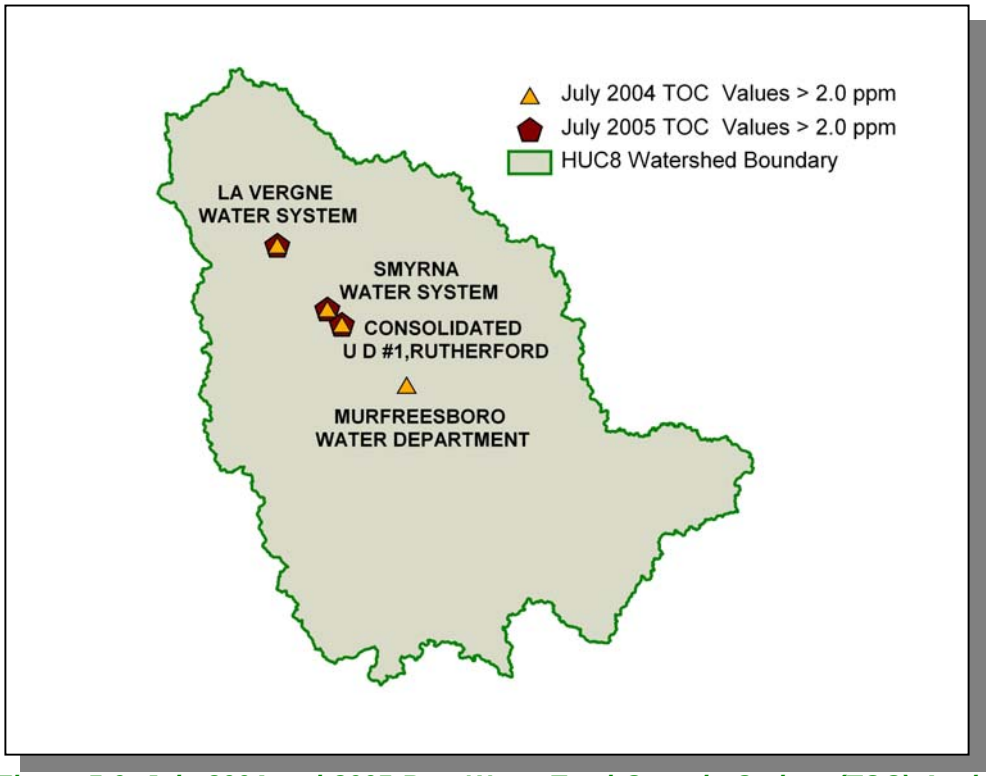

Figure 5-6. July 2004 and 2005 Raw Water Total Organic Carbon (TOC) Analysis in the Stones River Watershed.

5.3.B. State Revolving Fund. TDEC administers the state's Clean Water State Revolving Fund Program. Amendment of the Federal Clean Water Act in 1987 created the Clean Water State Revolving Fund (SRF) Program to provide low-interest loans to cities, counties, and utility districts for the planning, design, and construction of wastewater facilities. The U.S. Environmental Protection Agency awards annual capitalization grants to fund the program and the State of Tennessee provides a twenty-percent funding match. TDEC has awarded loans totaling approximately $500 million since the creation of the SRF Program. SRF loan repayments are returned to the program and used to fund future SRF loans.

SRF loans are available for planning, design, and construction of wastewater facilities, or any combination thereof. Eligible projects include new construction or upgrading/expansion of existing facilities, including wastewater treatment plants, pump stations, force mains, collector sewers, interceptors, elimination of combined sewer overflows, and nonpoint source pollution remedies.

SRF loan applicants must pledge security for loan repayment, agree to adjust user rates as needed to cover debt service and fund depreciation, and maintain financial records that follow governmental accounting standards. SRF loan interest rates range from zero percent to market rate, depending on the community's per-capita income, taxable sales, and taxable property values. Most SRF loan recipients qualify for interest rates between 2 and 4 percent. Interest rates are fixed for the life of the term of the loan. The maximum loan term is 20 years or the design life of the proposed wastewater facility, whichever is shorter.

TDEC maintains a Priority Ranking System and Priority List for funding the planning, design, and construction of wastewater facilities. The Priority Ranking List forms the basis for funding eligibility determinations and allocation of Clean Water SRF loans. Each project's priority rank is generated from specific priority ranking criteria and the proposed project is then placed on the Project Priority List. Only projects identified on the Project Priority List may be eligible for SRF loans. The process of being placed on the Project Priority List must be initiated by a written request from the potential SRF loan recipient or their engineering consultant. SRF loans are awarded to the highest priority projects that have met SRF technical, financial, and administrative requirements and are ready to proceed.

Since SRF loans include federal funds, each project requires development of a Facilities Plan, an environmental review, opportunities for minority and women business participation, a State-approved sewer use ordinance and Plan of Operation, and interim construction inspections.

For further information about Tennessee's Clean Water SRF Loan Program, call (615) 532-0445 or visit their Web site at http://www.tdec.net/srf.

Figure 5-7. Location of Communities Receiving SRF Loans or Grants in the Stones River Watershed. *More information is provided in Stones-Appendix V.*

5.3.C. Tennessee Department of Agriculture. The Tennessee Department of Agriculture's Water Resources Section consists of the federal Section 319 Nonpoint Source Program and the Agricultural Resources Conservation Fund Program. Both of these are grant programs which award funds to various agencies, non-profit organizations, and universities that undertake projects to improve the quality of Tennessee's waters and/or educate citizens about the many problems and solutions to water pollution. Both programs fund projects associated with what is commonly known as "nonpoint source pollution."

The Tennessee Department of Agriculture's Nonpoint Source Program (TDA-NPS) has the responsibility for management of the federal Nonpoint Source Program, funded by the US Environmental Protection Agency through the authority of Section 319 of the Clean Water Act. This program was created in 1987 as part of the reauthorization of the Clean Water Act, and it established funding for states, territories and Indian tribes to address NPS pollution. Nonpoint source funding is used for installing Best Management Practices (BMPs) to stop known sources of NPS pollution, training, education, demonstrations and water quality monitoring. The TDA-NPS Program is a non-regulatory program, promoting voluntary, incentive-based solutions to NPS problems. The TDA-NPS Program basically funds three types of programs:

- BMP Implementation Projects. These projects aid in the improvement of an impaired waterbody, or prevent a non-impaired water from becoming listed on the 303(d) List.

- Monitoring Projects. Up to 20% of the available grant funds are used to assist the water quality monitoring efforts in Tennessee streams, both in the state's 5-year watershed monitoring program, and also in performing before-and-after BMP installation, so that water quality improvements can be verified.

- Educational Projects. The intent of educational projects funded through TDA-NPS is to raise the awareness of landowners and other citizens about practical actions that can be taken to eliminate nonpoint sources of pollution to the waters of Tennessee.

The Tennessee Department of Agriculture Agricultural Resources Conservation Fund Program (TDA-ARCF) provides cost-share assistance to landowners across Tennessee to install BMPs that eliminate agricultural nonpoint source pollution. This assistance is provided through Soil Conservation Districts, Resource Conservation and Development Districts, Watershed Districts, universities, and other groups. Additionally, a portion of the TDA-ARCF is used to implement information and education projects statewide, with the focus on landowners, producers, and managers of Tennessee farms and forests.

Participating contractors in the program are encouraged to develop a watershed emphasis for their individual areas of responsibility, focusing on waters listed on the Tennessee 303(d) List as being impaired by agriculture. Current guidelines for the TDA-ARCF are available. Landowners can receive up to 75% of the cost of the BMP as a reimbursement.

The Tennessee Department of Agriculture has spent $110,041 for Agriculture BMPs in the Stones River Watershed since 1998. Additional information is provided in Stones River Stones-Appendix V.

Since January of 1999, the Department of Agriculture and the Department of Environment and Conservation have had a Memorandum of Agreement whereby complaints received by TDEC concerning agriculture or silviculture projects would be forwarded to TDA for investigation and possible correction. Should TDA be unable to obtain correction, they would assist TDEC in the enforcement against the violator.

5.3.D. Tennessee Wildlife Resources Agency. The Tennessee Wildlife Resources Agency conducts a variety of activities related to watershed conservation and management. Fish management activities include documentation of fish and aquatic life through stream sampling and stocking of both warm water and cold water sportfish. Fish data are managed in the Geographic Information System (GIS) project called Tennessee Aquatic Data System (TADS). TWRA nongame and endangered species projects include restoration of special status fish ,aquatic life, and riparian wildlife including otters, and nongame fish such as the blue masked darter. The Agency conducts a variety of freshwater mussel management, conservation, and restoration projects including the propagation and reintroduction of species once common in Tennessee streams. TWRA has been involved in riparian conservation projects since 1991 in partnership with state and federal agencies and conservation groups.

For information on these and other water resources related activities, please contact your Regional TWRA office at the following phone numbers:

West Tennessee (Region I)	1-800-372-3928
Middle Tennessee (Region II)	1-800-624-7406
Cumberland Plateau (Region III)	1-800-262-6704
East Tennessee (Region IV)	1-800-332-0900.

TDD services are available @ 615-781-6691.
TWRA's website is http://www.state.tn.us/twra.

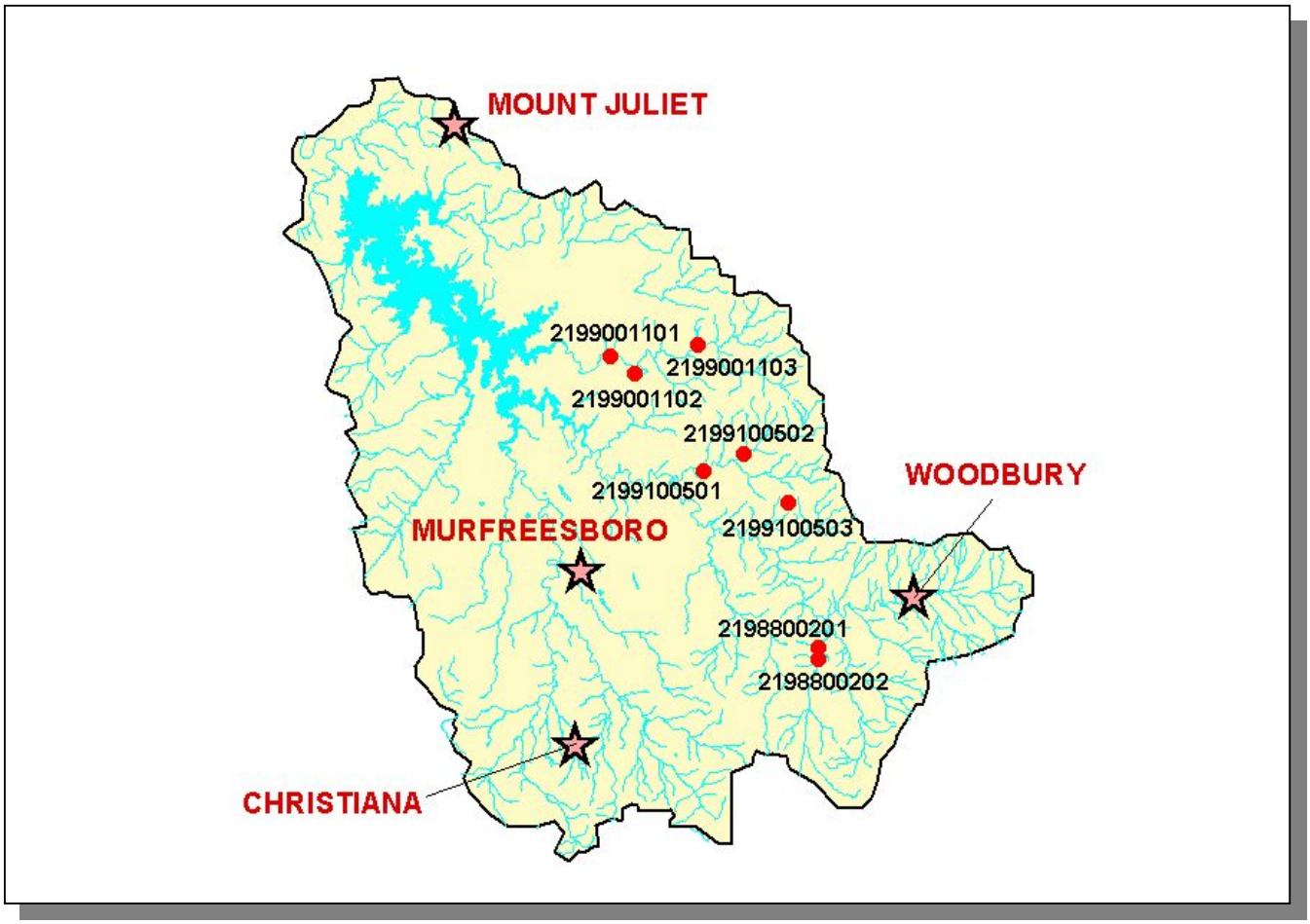

Figure 5-8. Location of TWRA TADS Sampling Sites in Stones River Watershed. *Locations of Mount Juliet, Murfreesboro, Christiana, and Woodbury are shown for reference. Additional Information is presented in Stones-Appendix V.*

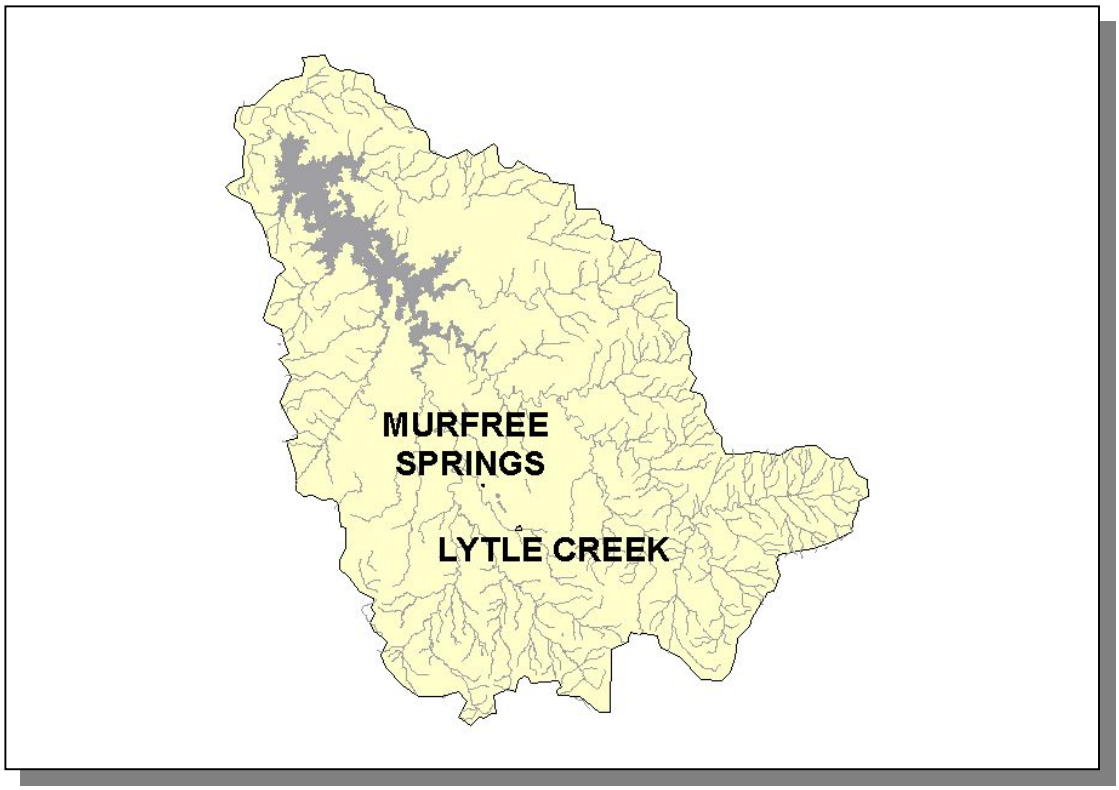

Figure 5-9. Location of TWRA Wetland Sites in Stones River Watershed Purchased with Wetland Mitigation Funds.

5.4 LOCAL INITIATIVES.

5.4.A. Black Fox Wetland League. The Black Fox Wetland League was formed in 1989 for the primary purpose of saving Black Fox Spring and other wetlands. Developers had bought a large acreage encompassing Black Fox Spring and had placed a large drainage ditch directly into the Spring. Sediment was rapidly filling in the large "blue hole" spring. A phone call to developers by a concerned citizen only served to place hay bales and hardware cloth that immediately washed into the Spring. Because a voice from two concerned individuals did not carry much weight, the two were challenged to form a strong non-profit organization. With the help of the State, the newly organized Black Fox Wetland League managed to have the contractors divert the ditch around the Spring into a retention pond with slow release into the stream below.

In the research that followed, it was discovered that the City of Murfreesboro actually owned ten acres including the Spring, and a right-of-way to it. Developers had already built homes on the City's right-of-way. Deeds were cleared up and a new right-of-way given to the City who now claimed their rightful water. It had been purchased in the earlier part of the twentieth century to protect the city's water supply. The stream from the spring flowed eventually into Murphy Spring off Broad Street in downtown Murfreesboro where the City got its water until the early seventies. They now get their water from the East Fork Stones River at Walter Hill. The Black Fox Wetlands League, with donations and grants, managed to purchase acreage adjacent to the city's Black Fox Spring to further protect the water.

The Black Fox Wetlands League achieved its primary purpose. For the past few years, meetings were held monthly with frequent newspaper coverage which served to make the public aware of, and its value as, a wetland. It was a winter hunting camp for Chief Black Fox of the Cherokee Nation, a camping spot on the Trail of Tears. It also held a trading post for Native Americans, and the first residents of the city built there.

The Discovery House of Murfreesboro joined with the Black Fox Wetland League in making the city realize the advantages of a nature area for study of wetlands and all other aspects of nature. The city then donated the old Water Plant off downtown Broad Street to the Discovery House, who are now building a new Discovery House there, and the City is also building boardwalks in the twenty acre wetland adjacent to the old water plant. This will be a study and bird watching area and will connnect to the city's Greenway.

The Back Fox Wetlands League has recently donated their property to the City for a rustic park. The League was also influential in having the Tennessee Wildlife Resources Agency purchase thirty-five acres immediately across the road from their property by the Black Fox Spring. It is planned that eventually this will all be connected to the City's Greenway System.

The Black Fox Wetland League has now turned its sights to other wetlands in Rutherford County and to the further protection of the West, Middle, and east Forks of the Stones River.

For more information about the Black Fox Wetlands League, contact Bertha Chrietzberg at bertha@heartoftnnet.

5.4.B. Friends of Murfreesboro Greenway. The Murfreesboro Greenway gets heavy use from walkers and bikers. It lies along the West Fork Stones River and its tributary, Lytle Creek. It is located in the heart of downtown Murfreesboro. Three miles of the Greenway runs along the West Fork of the Stones River, and one and one half miles along Lytle Creek. An additional spur trail of one and one half miles connects Stones River National Battlefield Park where the Civil war Battle of Stones River took place. Another six and one half miles is now being built upstream of the West Fork Stones River and extends to the Barfield Community Park of Murfreesboro.

Building this Greenway has enhanced the water quality of the West Fork Stones River and Lytle Creek tremendously. Stores and businesses back up to the river and it was commonly used as a garbage dump. Many factories, including a battery plant occasionally dumped in the river. A lot of algae and a few carp were found in this polluted stream. Now, the fish have come back, and the banks and river are kept clean. The additional six and one half miles upstream will enhance it even more. There is some concern, however, as to the effect on wildlife. With all the people using the Greenway, their habitat and safety are gone.

The present portion of the Greenway was built by the Federal Government to commemorate the Battle of Stones River, and then turned over to the City of Murfreesboro for maintenance and upkeep.

For more information about the Friends of the Murfreesboro Greenway, contact Bertha Chrietzberg at bertha@heartoftnnet.

5.4.C. The Nature Conservancy. The mission of The Nature Conservancy is “to preserve the plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive."

Flat Rock Cedar Glades State Natural Area is located in the Stones River watershed, just three miles east of Murfreesboro. Famous for its globally unique cedar glade habitats and numerous state and federally listed plant species, Flat Rock also comprises Tennessee's largest block of protected properties that were purchased solely for cedar glade preservation. Land acquisition projects between The Nature Conservancy's Tennessee Chapter and Tennessee's Department of Environment and Conservation total almost 1,000 acres that are now managed within the State Natural Area.

For more information, contact Chris Roberts, Stewardship Ecologist, croberts@tnc.org